

Monitoring Conducted

BWCAW Management Areas

To achieve the monitoring objectives for management of the Boundary Waters Canoe Area Wilderness (BWCAW) involving the preservation of wilderness character, the Wilderness has been divided into four management areas: Pristine, Primitive, Semi-primitive Non-motorized, and Semi-primitive Motorized. (see pp 3-40 to 3-65 of Revised Forest Plan). The desired future conditions of both the physical and the social aspects of the resources differ slightly between management areas. This establishes a framework for managers that allow them to provide a range of wilderness opportunities for the public while maintaining the overall goals of preserving the natural ecosystem and protecting the integrity of the Wilderness for future generations.

Wilderness Summary Points

- ✱ Due to extra funding and newly created or enacted management plans, the Superior National Forest is at 61% of the wilderness stewardship level, and intends to go beyond 61% after 2008 due to advances in Elements 2, 5, 6 and 9.
- ✱ The effects of non wilderness management activities to wilderness character inside the BWCAW were documented in 2006 and 2007 project decisions and through Forest wide monitoring.

Monitoring Activities

A. Monitoring questions for social conditions and land stewardship

1. Visitor Use
 - a. Use levels.
 - b. Travel Patterns.
 - c. Use Levels by time of year.
 - d. Average Party Size
 - e. Origin of Party
2. Compliance with rules, regulations and reserving/issuing permits
 - a. Cancellations.
 - b. Party Leader Names.
 - c. Alternates.
 - d. Entrance Date.
 - e. Entrance Point
 - f. Mode of Travel
3. No Show Rate for overnight and day use motor permits
4. Social Encounters – levels of crowding and opportunities for solitude

B. Monitoring for campsite conditions

1. Shoreline disturbance
 - a. Compare shoreline to adjacent shoreline.
 - b. Measure in lineal feet the amount of shoreline impacted by recreational use.
 - c. Measure all shoreline areas for each campsite
2. Campsite area
 - a. Measure in square feet the total area impacted by recreational use.
 - b. Define site perimeter by determining the point at which the density and species composition of the vegetation become equal to that of the surrounding area.
 - c. Exclude the islands of undisturbed vegetation and ledge rock within the campsite area.
 - d. Measure and include areas beyond the original perimeter such as satellite tent pad and firewood cutting areas.
 - e. Record unusual conditions that can be related to historical uses
3. Non-vegetated area
 - a. Measure the campsite area that is devoid of ground vegetation due to the use of camp sites.
 - b. Compare vegetative conditions on the campsite with natural conditions adjacent to the site
 - c. Record the total area(s)
4. Exposed mineral soil
 - a. Measure in square feet the non-vegetated areas where soil is bare, or with little or no litter cover
 - b. Record the total area(s)

5. Tree damage
 - a. Count the trees with a DBH of 2" or larger that have been damaged by recreation impacts
 - b. Record total number of and damaged trees within the campsite and associated areas
 - c. Note type of damage
6. Root exposure
 - a. Count the trees with exposed roots resulting from recreation impact. b. Compare to off-site non-impacted tree roots. c. Record the number of trees with exposed roots
7. Trails
 - a. Count the access and social trails leading to or away from the campsite.
 - b. Record the number of trails
8. Erosion. Monitoring categories levels:
 - a. Campsites that have no erosion at the shoreline and negligible erosion on the campsite and access trails. b. Campsites with erosion either on the campsite, access trails, or at the shoreline resulting in the loss of soils which is not pronounced. c. Erosion which has become pronounced, resulting in access trails becoming gullied; the exposure of lighter colored subsurface soils or gravel on the site; or obvious loss of soil at the landing or along the shoreline

Note: Monitoring may include Rapid Campsite Assessments and/or Monitoring for Maintenance needs. Limits for Acceptable Change monitoring data gathering techniques are currently not used unless there are campsite rehabilitation requirements changing the campsite condition due to reasons other than recreational use. Monitoring may also include monitoring for opportunities for solitude.

C. Monitoring for the 10-Year Wilderness Challenge

As the Forest Service began to evaluate the stewardship efforts for wilderness, we discovered that in 2003, only 18 percent of the 406 wildernesses under our care were managed to a minimum stewardship level. That is why the Chief adopted the "10-Year Wilderness Stewardship Challenge" (10YWSC) recommended by the Chief's Wilderness Advisory Group. By adopting the 10YWSC, the Forest Service is renewing its commitment to wilderness by pledging to bring all 406 wildernesses we administer up to a minimum level of stewardship within 10 years – as the 50th Anniversary of the Wilderness Act is celebrated in 2014. This is an ambitious goal, which will require an interdisciplinary approach. Wilderness encompasses a myriad of resources that are integral to its whole, including recreation, heritage, air, water, soil, wildlife, fish, range, and fire.

A wilderness is considered to be managed to a minimum stewardship level when achieving a cumulative accomplishment level score of 60 or greater on the following 10 elements:

- (1) Direction exists in either the Forest Plan or subsequent planning documents that address the natural role of fire in wilderness and considers the full range of management responses.
- (2) The wilderness was successfully treated for non-native, invasive plants.
- (3) Monitoring of wilderness air quality values is conducted and a baseline is established for the wilderness.
- (4) Priority actions identified in a wilderness education plan are implemented.
- (5) The wilderness has adequate direction, monitoring, and management programs to protect opportunities for solitude or primitive and unconfined recreation.
- (6) The wilderness has a completed recreation site inventory.
- (7) Outfitter and guide operating plans exist for the wilderness direct outfitters to model appropriate wilderness practices and incorporate appreciation for wilderness values in their interaction with clients and others. Needs assessments are completed for new operations or for major changes to existing outfitter programs.

- (8) The wilderness has adequate direction in the Forest Plan to prevent degradation of the wilderness resource.
- (9) The priority information needs for the wilderness have been addressed through field data collection, storage and analysis.
- (10) The wilderness has a baseline workforce in place.

D. Analysis and Monitoring for Wilderness Character

The effects of non wilderness management activities on wilderness character particularly solitude was addressed within 2006 and 2007 project decisions. In addition Non Native Invasive Species (NNIS) expansion and motorized use originating from new roads outside the wilderness were monitored during 2007. Expected opportunities for solitude and isolation for each Wilderness Management Area are outlined above in the BWCAW Management Areas section.

Evaluations and Conclusions

A. Monitoring for social conditions and land stewardship.

The following are summaries for public contacts (Table 1), training, and presentations (Table 2) that portray the extent to which the SNF has reached out internally and externally to communicate messages that foster favorable land stewardship within the BWCAW. Table 3 (Reservation Lottery) outlines visitor use patterns that help the SNF develop strategies to effectively communicate to the public. The following information does not evaluate how well 2007 accomplishments have achieved specific Forest Plan Decade 1 objectives or projected conditions but rather how well management has complied with the current Wilderness Management Plan which was affirmed through the Revised Forest Plan.



Table 1. Public Contacts							
Public Contacts	LaCroix	Kawishiwi	Tofte & Isabella	Gunflint	Laurentian	Headquarters	Totals
Field Contacts	405	1,271	620	501	0	0	2,797
BWCAW Permits Issued at a F.S. Facility	673	5,353	2,533	2,180	178	409	11,326
BWCAW Video User Viewers	2,127	21,412	7,599	6,540	712	1,636	40,026

Table 2. Training/Presentations/Surveys/Projects Necessary to Meet Land Stewardship Goals

Item	LaCroix	Kawishiwi	Tofte & Isabella	Gunflint	Total
Training/Refreshers # of Employees					
Level II LE	4	11	12	10	37
Cross Cut Saw	5	47	5	7	64
CPR/First Aid	5	21	10	8	44
BWCAW Permit Issuance	5	9	4	4	22
Public Presentations					
Moose Hunter Orientation	1	0	1	2	4
Leave No Trace Program (# of programs)	1	6	42		49
Fire Safety Presentations	2	No available data	30		32
Volunteer Group Hours	2,248	17,819	3,104		23,171
Surveys/Inventories					
Heritage					
* Sites surveyed (campsites & portages)	0	51	12	53	116
* Sites monitored	0	21	3	6	30
NNIS 1. Weed Inventory & Control - La Croix 2. Spiny Water Flea 3. Rusty Crayfish	<ul style="list-style-type: none"> ▪ 0.12 acres of weeds newly documented, 135 previous sites inventoried, 0.3 acres controlled ▪ Basswood Lake surveyed– none found ▪ 10 lakes and rivers surveyed – 9 out of 10 contained rusty crayfish 				
Fire Program Support: 2 wildfires, public safety-wilderness res. advisors	3 rangers	6 rangers, 84 days	4 rangers, 42 days	6 rangers, 84 days	19 rangers
Winter Patrol Days 2007 only	8	9	30		47
Law Enforcement – Forest-wide	*Warning Notice 6, Incident Report 149, Violation Notice 48 * Main incidents – motorized use, garbage, no permit, cans and bottles				

Table 3. BWCAW Reservation Lottery

2004-2007 Statistics				
Total Number of Lottery Applications:	2004	2005	2006	2007
	7,087	7,490	8,132	8,646
Successful Applicants				
Day Use Motor	2,487	2,460	2,481	2,409
Day Use Motor – Canada	17	15	28	15
Overnight Motor	766	782	741	765
Overnight Paddle	3,221	3,085	3,300	3,333
Overnight Hiker	3	2	0	5
Total:	6,494	6,344	6,550	6,527
Denied Applicants				
Day Use Motor	492	1,063	1,455	1,986
Day Use Motor – Canada	6	8	9	4
Overnight Motor	52	52	90	103
Overnight Paddle	43	23	28	26
Total:	593	1,146	1,582	2,119
Total Number of Reservations May 1-Sept 30*:	2004	2005	2006	2007
	39,169	35,990	35,527	35,481
*Note: Total reservations include no-shows, cancellations and voided permits. Motor quotas and closures due to fire may affect available quota to reserve. Numbers gathered from Query.				



B. Monitoring for campsite conditions

Table 4 displays 2007 campsite conditions documented through campsite inspections and corrective actions or mitigation implemented to enhance visitor safety and travel and restore or maintain resource conditions. These actions promote desired settings and behaviors necessary to promote land stewardship.

Table 4. Campsite Conditions					
Campsites	LaCroix	Kawishiwi	Isabella & Tofte	Gunflint	Total
Routine campsite maintenance	429	1,074	470	429	2,402
Latrines Dug	51	58	18	51	178
Latrines Reset	51	3	0	4	58
Fire Grates Replaced	3	15	3	4	25
Tent Pads Rebuilt	2	1	4	1	8
Campsite Erosion Control Projects	5	8	7	4	24
Tree Planted at Campsites	0	0	383	0	383
Trees					
Hazard Trees Felled	23	194	18	266	501
Trees Bucked	85	439	359	513	1,396
Trees Low-stumped	23	57	39	50	169
Portages					
Rods of Portages Brushed and Cleared	17,774	7,502	1,318	12,676	39,270
Miles of Hiking Trail Brushed and Cleared	24	34	35	25	118
Water Bars Cleaned	211	95	69	54	429
Water Bars Installed	18	9	11	7	45
Portage Tread Projects	4	5	8	1	18
Square Footage of New Boardwalk	0	0	Patched 1	88	88
Check Dams Installed	19	20	29	0	68
Culverts Installed	0	0	0	0	0
Gradient Dips Installed	0	2	0	0	2
Illegal Site Rehabilitation	0	0	0	0	0

C. Monitoring for the Ten-Year Wilderness Challenge

Each wilderness shall be measured against the accomplishment levels for all 10 primary output elements. A minimum cumulative score of “60” out of “100” must be achieved in order for a wilderness to be considered as meeting the “minimum stewardship level.” Currently, the Superior NF has a “61” after the 2007 season. Refer to Section C, page 95 for clarification on determination of scores.

Element 1 – Fire Plans

-10 points = Implementation of the Forest Plan fire management direction is evaluated for effectiveness and modifications are made as needed.

- Highlight for 2007: The Fire Plan was updated in 2006.

Element 2 – Non-native, Invasive Plants (NNIS)

-3 Points = A non-native, invasive species management plan has been prepared or direction is provided in the Forest Plan and includes direction for addressing invasives in wilderness.

- Highlight for 2007: During the summer of 2007, the Forest completed the NNIS baseline data creating a NNIS priority management area map.

Element 3 – Air Quality Values

-10 Points = Monitor priority sensitive receptors for trends from baseline (other than IMPROVE visibility monitoring)

Element 4 – Wilderness Education Plans

-6 Points = Develop wilderness education plan, or if existing, review and make necessary modifications.

Element 5 – Opportunities for Solitude

-4 Points = Adequate direction sufficient to protect opportunities for solitude or primitive and unconfined recreation is included in the Forest Plan.

- Highlight for 2007: The SNF is currently evaluating 12 forest-wide “problem” areas.

Element 6 – Recreation Site Inventory

-6 Points = Recreation site inventories are conducted in highest priority areas within the times specified in the site inventory plan. Data must be accompanied by a documented site monitoring protocol.

- Highlight for 2007: Recent data show a higher percentage of wilderness campsites as inventoried than previously known.

Element 7 – Outfitter and Guides

-8 Points = Monitoring is conducted on at least 25% of outfitter and guides permittees to evaluate if they are implementing conditions related to wilderness values identified in their operating plans.

Element 8 – Adequate Plan Standards

-6 Points = “Adequate direction” exists in the forest plan or individual wilderness plan that has been formally incorporated into the forest plan.

- Highlight for 2007: The success of meeting BWCAW Plan standards is under evaluation.

Element 9 – Information Management

-4 Points – Data collected from inventory and/or monitoring activities are entered into a database, or other suitable analytical tool (such as a spreadsheet), and analyses are conducted.

- Highlight for 2007: The Forest has begun data entry into I-web for our self-issue permits, and our mandatory permit data is collected when permits are issued via our reservation system.

Element 10 – Baseline Workforce

-4 Points – Unit meets 70% or more of the baseline workforce. According to the national complexity table, baseline funding for the BWCAW is 14.1 Full Time Equivalents (FTE’s).



- Highlight for 2007: Funding in 2007 financed a workforce of 27 FTE's or almost twice the baseline to manage the BWCAW. Over ½ of these funds came from the Recreation Enhancement Act (REA) Fee from the permit system. If REA funds were not available, only 12.9 FTE's or 91% of necessary baseline funding would be available. However, the BWCAW is still in need of more work - especially during winter.

With additional emphasis on NNIS (element #2), Opportunities for Solitude (element #5), Recreation Site Inventory (element #6), and Information Management (element #9) next fiscal year, the SNF intends to elevate the Wilderness Challenge score in 2008.

D. Analysis and Monitoring for Wilderness Character

The effects of non wilderness management activities on wilderness character particularly solitude was raised in several project decisions during 2006 and 2007. Noise impacts to wilderness character were addressed in two 2007 project NEPA documents and two 2006 project decisions. Moreover, two other activities that potentially could affect wilderness character (NNIS expansion and motorized use originating from new roads) were monitored. Expected opportunities for solitude and isolation for each Wilderness Management Area are outlined in the revised Forest Plan on pp 3-40 to 3-65. Table 5a displays how noise, NNIS, and illegal motorized access impacts to wilderness character were addressed or monitored for each project.

Table 5a. Analysis and Monitoring for Wilderness Character		
NEPA Projects		
Issue/Project	Operational Standards & Guides	Analysis
Noise Echo Trail Veg Project (2007)	Units located adjacent to or within noise impact distance from recreation sites would be harvested during low use seasons (November-April) to minimize conflict with recreational users. Harvest operations may be restricted to "winter" for recreation or other resource reasons.	Impacts addressed in Environmental Impact Statement, particularly Background ROS. P 3-89. Last paragraph. Identified in Direct and Indirect Effects Common to All Action Alternatives P.3-98. Paragraphs 3 & 4. Page 3-99 paragraph 3. Page 3-103 Table 3.9-4.
Noise Kawishiwi Drilling (2007)	Noise abatement measures shall be used to reduce impact to private residences and recreation use within the project area. The measures shall include: 1. Baffles: A noise abatement baffle system shall be utilized such as systems incorporating absorbent synthetics manufactured by Sound Seal, or other affective methods. 2. Exhaust extension: The exhaust of the drilling engines shall be extended and directed up into the air to help direct engine sound upward, rather than laterally. Sound monitoring at wilderness entry points will be conducted during active operations and outside of active operations to determine ambient background noise levels.	Impacts addressed in Environmental Analysis particularly 1.84, 2.5, 3.2, 3.3, 3.6, and 3.8.2.
Noise South Fowl Snow mobile Trail (2006)		Impacts addressed in Environmental Analysis particularly 3.2.5.
Noise Tomahawk Veg Treatment (2006)	No logging operations on weekends from May-October (high use season). No clearcut within 200 feet of BWCAW entry point parking area. Thinning to a basal area of 80 sq.ft./acre would be allowed. All slash within this 200' zone would be removed or lopped/scattered.	Impacts addressed in Environmental Analysis section 3.2.7 pp 167-178.

Table 5b Analysis and Monitoring for Wilderness Character Monitoring	
Monitoring	
Motorized Incursions Forest Wide Monitoring	During 2006 and 2007, RMV use within selected areas near the Boundary Waters Canoe Area Wilderness (BWCAW) were monitored to identify and document motorized intrusions into the BWCAW. The intent of monitoring was to determine the source or point of illegal motorized use into the wilderness with particular focus on recent management activities especially roads. To date we've found that all road spurs or user created/maintained trails found inside the BWCAW originated from established roads associated with timber sales that predated the 2004 Revised Forest Plan. (See RMV write up section).
Motorized Incursions Glacier Project	During September 2007 monitoring personnel evaluated the effectiveness of 17 previous salvage and fire management treatments within the Glacier Project area. Many of these older treatments occurred adjacent to the BWCAW. Several items were monitored including establishment and spread of NNIS and RMV encroachment into the BWCAW resulting from logging and road building activities near the wilderness. No motorized incursions or NNIS populations originating from previous management were found in the BWCAW. However one population of NNIS was found on a portage near the wilderness. This population was reported to the Forest NNIS coordinator.
(NNIS) Glacier Project	

Research

The SNF initiated, assisted, or approved eight research projects associated with Wilderness (Table 6). This research was important in that it will provide valuable information that everyone can use to improve wilderness and forest management.

Table 6. Research	
Research	Researcher
Lake Water Quality Assessment	Minnesota Pollution Control Agency
Spruce Bud Worm Epidemics on SNFE	North Central Research Station, USFS
Reconstructing Climate from Tree Rings in Minnesota	University of Minnesota
Forest Inventory Analysis Plots	Minnesota DNR, National FIA
Impacts of Blowdown and Prescribed burns on Water Quality and Vegetation	Bard College
Factors of Change Influencing Experiences and Relationships w/ BWCAW	Aldo Leopold Wilderness Research Institute
Blowdown Vegetation Succession	University of Minnesota
Bedrock Geologic Mapping in Cavity Lake Fire Area	Minnesota Geological Survey – University of Minnesota